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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/784,898	02/16/2001	Lloyd Steven White	W9494-01	4417

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EXAMINER
GRIFFIN, WALTER DEAN

ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 04/29/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/784,898	WHITE ET AL.	
	Examiner	Art Unit	
	Walter D. Griffin	1764	

-- The MAILING DATE of this communication appears on th cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 April 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-82* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *24-35,39-53,57-71,75-77 and 79-81* is/are allowed.

6)☒ Claim(s) *1,6-23,36-38,54-56,72-74,78 and 82* is/are rejected.

7)☒ Claim(s) *2-5* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

Claims 1, 13, 24, 33, 51, and 69 are objected to because of the following informalities: In the last line of claim 1, the word "compound" should be "compounds". In claims 13, 33, 51, and 69, the word "naphtha" should apparently be inserted after the expression "straight run". In line 10 of claim 24, the word "compare" should apparently be "compared". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 18-20, 36-38, 54-56, and 72-74 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Each of claims 18-20, 36-38, 54-56, and 72-74 is indefinite because it is unclear if the additional sulfur reduction step in each claim refers to the non-membrane process in independent claims 1, 24, 42, and 60 or refers to another sulfur reduction step.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 6-18, 21-23, 78, and 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cahn (3,244,763) in view of Carnell et al. (4,978,439).

The Cahn reference discloses a process for separating a component from a fluid mixture. A specific separation disclosed is the separation of a sulfur compound (i.e., mercaptan) from a hydrocarbon stream. The process comprises conveying a feed stream past one side of a solid membrane and conveying a re-extraction fluid (i.e., sweep stream) past the other side of the membrane. This sweep stream may be liquid or a gas. Therefore, perstraction and pervaporation conditions are disclosed. The component to be separated from the mixture is then transported from the fluid mixture to the sweep stream. The removal of mercaptans from a hydrocarbon feed would necessarily result in a sulfur-enriched stream and a sulfur reduced hydrocarbon stream.

Regarding the sulfur enrichment factor, the membranes of Cahn would necessarily have this characteristic since they are selective for sulfur compounds. See col. 2, lines 11-28 and 54-63; col. 3, lines 8-26; col. 4, lines 1-9, 36-53, and 65-71; and col. 5, lines 36-44 and 59-71.

The Cahn reference does not disclose the claimed feeds, does not disclose aromatic sulfur compounds, does not disclose the non-membrane sulfur reduction process for the permeate, does not disclose the claimed sulfur concentrations in the sulfur deficient fraction, does not disclose the limitation of claim 23, and does not disclose combining the two fractions as in claim 78.

The Carnell reference discloses the hydrotreating of a sulfur-containing stream obtained from a membrane separation process. This stream may then be combined with the stream from the membrane separation zone. See col. 2, lines 6-12 and 41-53.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cahn by utilizing the claimed feeds because these feeds are hydrocarbons as disclosed by Cahn and therefore would be expected to be effectively treated in the disclosed process. By utilizing these feeds, the total amount of olefins in the product would be within the claimed range. Regarding the aromatic sulfur compounds, it also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cahn by separating these compounds because they are chemically similar to the disclosed sulfur compounds and therefore would be expected to be effectively separated in the disclosed process.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cahn by hydrotreating the sulfur-containing stream and combining it with the stream from the membrane separation zone as suggested by

Carnell because sulfur content will be reduced and there will be little or no loss of the useful hydrocarbon stream.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cahn by obtaining sulfur contents as in claims 6-8 because an undesired component would be removed to levels as low a possible.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cahn (3,244,763) in view of Carnell et al. (4,978,439) as applied to claim 1 above, and further in view of Khare (6,274,533).

The previously discussed references do not disclose an adsorption process as the non-membrane sulfur reduction process.

The Khare reference discloses a process in which sulfur compounds are removed from a hydrocarbon by contacting the hydrocarbon with an adsorbent. See col. 3, lines 13-25.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the previously discussed references by substituting the adsorption process of Khare for the hydrotreatment of Carnell because these two processes perform the equivalent function of desulfurization and the adsorption process has the additional advantage of retaining olefin content in the hydrocarbon.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cahn (3,244,763) in view of Carnell et al. (4,978,439) as applied to claim 1 above, and further in view of Podrebarac et al. (6,303,020).

The previously discussed references do not disclose a catalytic distillation process as the non-membrane sulfur reduction process.

The Podrebarac reference discloses a process in which sulfur compounds are removed from a hydrocarbon in a catalytic distillation process. See col. 3, lines 31-55.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the previously discussed references by substituting the catalytic distillation process of Podrebarac for the hydrotreatment of Carnell because these two processes perform the equivalent function of desulfurization and the catalytic distillation process has the additional advantage of maintaining the olefin content in the hydrocarbon.

Allowable Subject Matter

Claims 24-35, 39-53, 57-71, 75-77, and 79-81 are allowed.

Claims 2-5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 36-38, 54-56, and 72-74 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not disclose a process as claimed that uses polyimide, polyurea-urethane, or polysiloxane membrane.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art not relied upon discloses membrane separation processes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter D. Griffin whose telephone number is 703-305-3774. The examiner can normally be reached on Monday-Friday 6:30 to 4:00 with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marian Knode can be reached on 703-308-4311. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.

Walter D. Griffin
Primary Examiner
Art Unit 1764

WG
April 23, 2002